There is a large collection of examples, and the whole pamphlet is "teres atque rotundus."

Dr. Casey's "Treatise on Plane Trigonometry" is quite independent of the "Elementary Trigonometry" by the same author. It is a most comprehensive work, and quite as exhaustive as any ordinary student will require. Dr. Casey shows his usual mastery of detail, due to thorough acquaintance, from long teaching, with all the *cruces* of the subject. He has embraced in his pages all the usual topics, and has introduced several points of extreme interest from the best foreign text-books. A very rigid proof is given of the exponential theorem, and a section is devoted to interpolation. Dr. Casey approves of, but does not at present venture to adopt, the practice of French authors who use log sin A instead of our old friend L sin A, *i.e.* he would prefer $\bar{1}\cdot859$ to 9·859.

Chapters V. and VI., which are devoted to triangles and quadrilaterals, are exceedingly interesting, and contain quite a crop of elegant propositions culled from many fields. Following the course adopted by other recent writers, he gives a systematic account of imaginary angles and hyperbolic functions. "The latter are very interesting, and their great and increasing importance, not only in pure mathematics but in mathematical physics, makes it essential that the student should become acquainted with them." We may remark that Dr. Casey adopts the following notation: sh, ch, th, coth, sech, cosech, for sinh, cosh, &c.; and has gone further than his English predecessors in introducing at this early stage the angle $\tau$, Hoüel's *hyperbolic amplitude of* $\theta$ ($\tau = \text{amb.}\ \theta$). Numerous illustrative examples and tables afford practice to the student in this branch.

The modern geometry has a small niche, and here we note, as one of several small clerical errors come across, in addition to the list furnished, that (440) should have *cosecants* in place of *secants*. The special results, which on Dr. Casey's useful plan are numbered consecutively, reach 810. The book is rich in examples, and will be sure to find for itself a place on the mathematician's shelves within easy reach of his hand.

The object of the author of "A Higher Arithmetic and Elementary Mensuration" is to furnish a work suited to "the senior classes of schools, and candidates preparing for public examinations." A large number of typical exercises are worked out, and the student, being left to observe and think for himself, acquires, or should acquire, a sound practical knowledge of the subject, which the author rightly thinks will be more abiding than the knowledge of rules and definitions obtained by the mere committal of them to memory. For the benefit of beginners, in many of the examples the steps of the reasoning are given at some length, but the student is advised, as he grasps the details, to shorten the work as much as possible in the examples he subsequently works out. The text covers all the ordinary divisions under which arithmetic is discussed in the books, even our old friend alligation having a chapter assigned to it. The last two chapters are devoted to the mensuration of plane surfaces and of solids. There are 400 exercises at the end, in addition to a very great number scattered throughout the book. The whole is a vast storehouse of well-put matter, which should render a reader quite independent of any other text-book, and, we might say, of a teacher.

Book II. of "The Harpur Euclid" is on the lines laid down in the edition of Book I., and the subject is handled in an interesting manner. There is a sufficient number of good illustrative examples, with assistance enough to enable a thoughtful boy to work them out by himself. We are glad to see a few examples on antiparallels and symmedians. These lines must soon force their way to a foremost position even in a school curriculum. This is a useful and handy edition brought out in accordance with the Syllabus of the Association for the Improvement of Geometrical Teaching.

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## THE BOTANY OF THE AFGHAN DELIMITATION COMMISSION.

*The Botany of the Afghan Delimitation Commission.* By J. E. T. Aitchison, M.D., F.R.S., Naturalist attached to the Mission. Being Trans. Linn. Soc., Ser. 2, Bot. v. 3, pp. 1–139, tt. 1–48; with two Maps. (1888.)

OF this expedition Dr. Aitchison has already published, in the *Pharmaceutical Journal and Transactions*, Ser. 3, v. 17 (1887), a report on the drugs, and he is preparing a report on the zoology to appear in the Transactions of the Linnean Society.

In several previous collections and papers relating to the Punjab flora ("Flora of Jhelum," "Lahul, its Flora and Vegetable Products," "Flora of Hushiapore," "Hand-book of Trade Products of Leh"), and especially in his Report on the plants of the Kuram Valley, Dr. Aitchison had shown himself an excellent collector and an enthusiastic botanist; and by the knowledge of the Afghan flora he had acquired in this preceding work he was eminently qualified to make the most of the opportunities afforded on hasty marches and in rough camps. The Secretary of State for India, who employed Dr. Aitchison on this duty, may certainly be well satisfied with the present botanic section of the Report. In 28 quarto pages Dr. Aitchison describes the country traversed, and the general character of the vegetation, interspersed with many economic and agricultural remarks. The remainder of the Report consists of a list of the plants collected in order, with descriptions of the new species, most of which are figured. There are about 800 plants catalogued, whereof 53 are new to science. The whole forms a most valuable addition to our scientific knowledge of an interesting frontier region. Dr. Aitchison started from Quetta on September 22, 1884, and proceeding west struck the Helmund on October 19; following the course of the Helmund and Harut, he was close to Herat on November 4; the remaining nine months, up to September 1885, he was in Khorassan and Badghis, *i.e.* in North Cabul.

The dry region of South-West Asia extends into Western India—into Sind, the Punjab, Rajputana; but in his "Flora of British India," Sir J. D. Hooker accepts the political frontier of India as his western limit. It is impossible in local floras to find natural boundaries. Beluchistan and Cabul are thus excluded from the "Flora of British India." They are included in Boissier's "Flora Orientalis"; but Boissier had by no means plentiful material for this frontier. The additions now made by Dr. Aitchison are not to be estimated by the 53 new species alone, but by the further light thrown

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on numerous little-known species, and especially by the quantity of economic information collected.

Of the 800 plants enumerated, the richest orders are Leguminosæ with 78 species, Compositæ with 77 species, Gramina with 63 species, Cruciferæ with 57 species, Chenopods with 38 species. The large Umbelliferæ allied to Asafœtida are finely illustrated in plates 18 to 29; four new species are described. There remain still many points about these valuable gum-producing plants of Central Asia that are obscure. Of the 78 Leguminosæ, no less than 37 are of the genus Astragalus, and of these 13 are new. Of the petaloid Monocotyledons the most prominent are the Iridaceæ (2 new species of Iris), and the Liliaceæ (26 species, of which 3 are new).

The introductory narrative, with the lists of characteristic plants at different levels and localities, enables a phytographic botanist to apprehend the nature of the country and climate. Cabul is clearly a much richer country agriculturally than has been hitherto supposed. Corn can be cultivated without irrigation either above 3500 feet altitude, or in the vicinity of a river; and a large area between these levels is capable of irrigation. The dry and hot summer is, as was before well known, very favourable to the production of fruit, and it now appears almost equally so to the production of vegetables. Dr. Aitchison found "not uncommon," in clefts of rocks and escarpments of hill-sides, the common fig (*Ficus Carica*, Linn.), apparently wild; and collected both male and female branches, some of the male receptacles containing both male and gall flowers. Dr. Aitchison had few opportunities of examining the country above 5000 feet; at the spots he did visit he found a very scanty flora, and above 7000 feet absolute sterility.

Dr. Aitchison compared his collection in the Kew Herbarium, and had the assistance of Mr. W. B. Hemsley in the technical botanic work, and in arranging the plates; and the new species described are given as of "Aitchison and Hemsley," except a few Liliaceæ, &c., attributed to "Aitchison and Baker." By this plan Dr. Aitchison gives to botanists who cannot refer to the specimens a guarantee that the new species are "good," and that the list of names has been accurately worked out. It is indeed the closeness with which a list of the present kind is worked out that gives it more than a temporary value.

Praise is due to Dr. Murie, the Assistant Secretary of the Linnean Society, for the style in which this number of the Society's Transactions has been put out. Credit may certainly be given to the India Office for assisting in a publication of this class; somebody there must have discovered that the money spent by the old Company on Roxburgh and Buchanan-Hamilton, on Royle and on Wallich, was not money spent on ornamental books, but has been returned, many times over, to the Government coffers.

## *OUR BOOK SHELF.*

*The Principles of Agricultural Practice as an Instructional Subject.* By John Wrightson, Professor of Agriculture and Principal of the College of Agriculture, Downton. (London: Chapman and Hall, 1888.)

THIS is a useful text-book, written in an interesting style, and by one who shows that in addition to being scientific he is thoroughly practical. The subject-matter of the book was first delivered as lectures to science teachers, and it deals with the duties of teachers as well as the defects of students under examination. It exposes in commendable language the narrow grooves into which agricultural teaching under the Science and Art Department has fallen. This is called "molecular and microscopic" in place of "bold and comprehensive," which ought to be the suitable form of description if the Department were properly constituted.

The book is the first of a series of text-books. It disposes in a clear and unmistakable manner of many knotty points of difficulty to the farmer and to the student, in matters relating to the nature and composition of soils, kinds and qualities of manures—"artificial and natural," "general and special,"—also to the cultivation of soil, and the growth and rotation of crops. Under these various headings many popular fallacies are exposed, connected with the classification of soils, the action of lime and nitrate of soda when applied to soil, the value of silica and of farm-yard manure, the sources of the supply of nitrogen to the growing plant, and the supposed ultimate exhaustion of soil—called a "store-house, a laboratory, a vehicle"—by systems of cropping.

The merits and methods of "autumn-cleaning" are duly introduced. The valuable work of the Rothamsted experiments is fully acknowledged and concisely explained.

This new contribution to agricultural literature comes at an appropriate season, when there is a growing demand for text-books of a trustworthy kind: so few can be found which are not simply the incoherent drivel of men who have but a very limited and imperfect knowledge of the subject.

The work is written in a style which will lead the student to think for himself, and but for one serious blunder in the later pages we should have pronounced it to be exceptionally perfect. Partial toleration is extended to the practice of sowing down land to pasture with seeds swept from the stable-loft. The loss sustained by the country through Miss Ormerod's warble-fly is thrown into the shade by the loss which has resulted from this exploded system of seeding down to grass. We hope to see the error corrected in a second edition, which, judging from the value of the book, cannot be long in making its appearance.

*A Season in Sutherland.* By J. E. Edwards-Moss. (London: Macmillan, 1888.)

THIS is a pleasant little book, though it affords no kind of information to the naturalist or to the sportsman, while it can hardly pretend to rank as a contribution to *belles lettres*. But Mr. Edwards-Moss is acquainted with certain districts in the north of Sutherlandshire; he has thrown a fly, and shouldered a breechloader; and he writes of his experiences in an unpretentious and graceful way which ought to commend the little volume as an accompaniment to an after-dinner cigar. He also quotes freely from contemporary and other authorities, including amongst these that profound thinker and teacher, Mr. Mallock. Mr. Mallock, as quoted by Mr. Edwards-Moss, tells us that we should "learn to love the sea, and the woods," and also "the wild smell of the heather"; from which we may gather that Mr. Mallock has probably discovered some portion of the country in which the heather smells of patchouli.

## *LETTERS TO THE EDITOR.*

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

### "Sky-coloured Clouds" at Night.

IN NATURE, June 28 (p. 196), Mr. Backhouse notes the appearance of illuminated clouds to northward at night. Similar

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